MA1025: FINITE MATHEMATICS FOR OPERATIONS RESEARCH
Winter 2004

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Texts: *Introduction to Mathematical Structures and Proofs*, L.J. Gerstein, Springer-Verlag/Jones and Bartlett 1996, and *An Introduction to Mathematical Reasoning*, P.J. Eccles, Cambridge 1997
Course website: http://www.math.nps.navy.mil/∼ras/teaching/ma1025/ma1025.html
Blackboard site: under development

MA1025, Finite Mathematics for Operations Research, is an introductory course in logic and elementary discrete mathematics for students in both operations research and computer science curricula. Considerable emphasis is placed on propositional and predicate logic, and on techniques of mathematical proof. The goal is to prepare students for subsequent theoretical courses in their respective curricula. The course is also a prerequisite for MA3025, which is taken by CS majors. Mathematical topics include the fundamental theories of sets, functions, and relations. Coverage of elementary enumerative combinatorics includes the sum and product rules, an introduction to permutations and combinations, and the binomial coefficients. Greater detail can be seen in the course schedule, below.

Grading will be based upon regular quizzes and three exams. Homework will be assigned but not collected; quizzes will be based on the homework. Approximate weights will be 100 possible points for each of the first two exams, 100 possible points based on the quiz average, and 200 points for the final exam. Some quizzes and parts of the exams might be of the take-home variety. It will be expected that all such work submitted for grading be done independently. Any exceptions to this policy will be clearly announced. Following is the anticipated course schedule, subject to mid-quarter adjustment if needed. Section references are to the text by Gerstein.

Week	**Sections**	**Topics**
1	1.1, 1.2	Propositions, Theorems, Logical Connectives
	1.3	Conditional Statements
2	1.4, 1.5	Logical Equivalence, Proof Structures and Strategies
	2.1	Fundamentals of Sets
3	2.3, 2.4	Quantifiers, Set Inclusion
4	2.5, 2.7	Set Operations, the Power Set
		EXAM I
5	2.10	Mathematical Induction, Recursion
6	2.6, 2.8	Indexed Sets, Cartesian Products
7	2.9, 3.1	Set Partitions, Relations; Functions: Definitions/Examples
8	3.2, 3.3	Functions: Properties, Composition
		EXAM II
9	4.1, 5.2	Cardinality and Fundamentals of Counting
	5.2	Sum and Product Rules
10	5.3,5.8	Permutations; Binomial Coefficients
11		Problem Solving, Review
12		FINAL EXAM (Wednesday, 24 March)

MA/Ra, 5 January 2004